**FIG. 2**

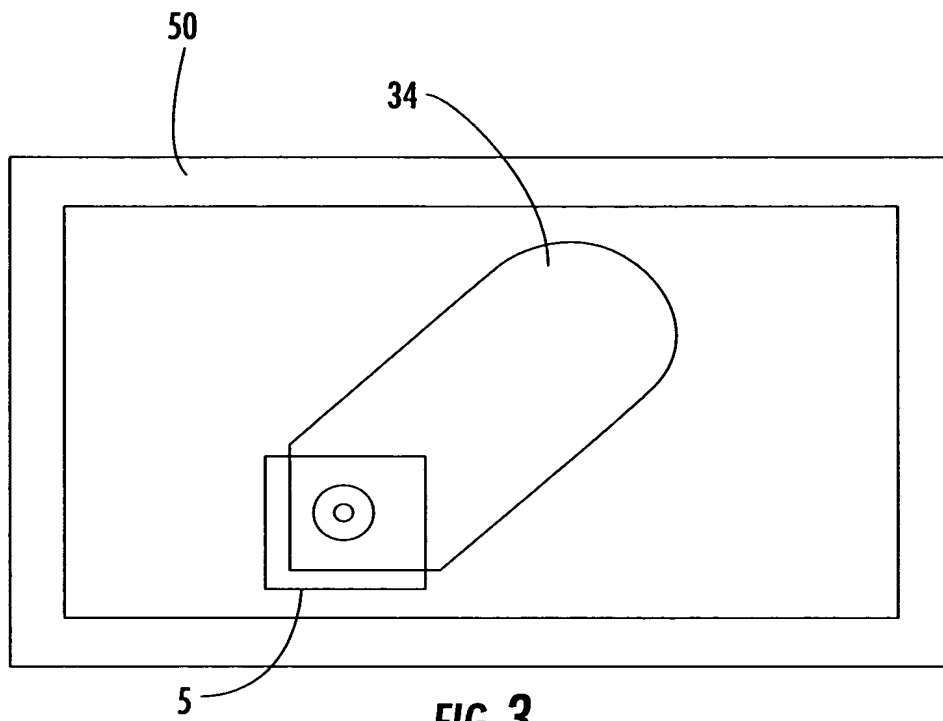


FIG. 3

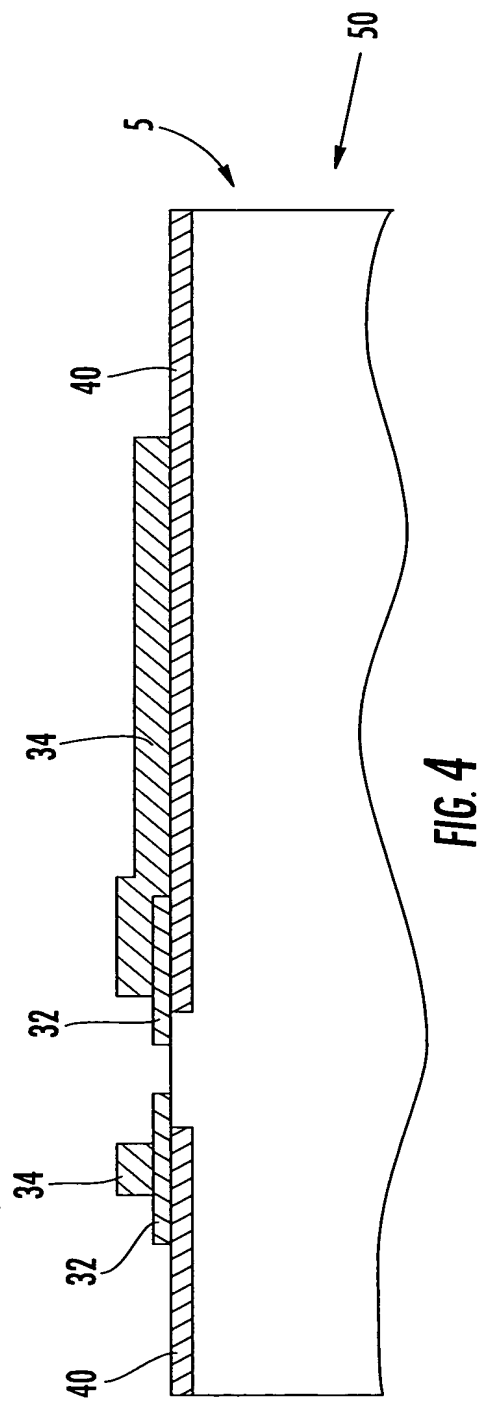
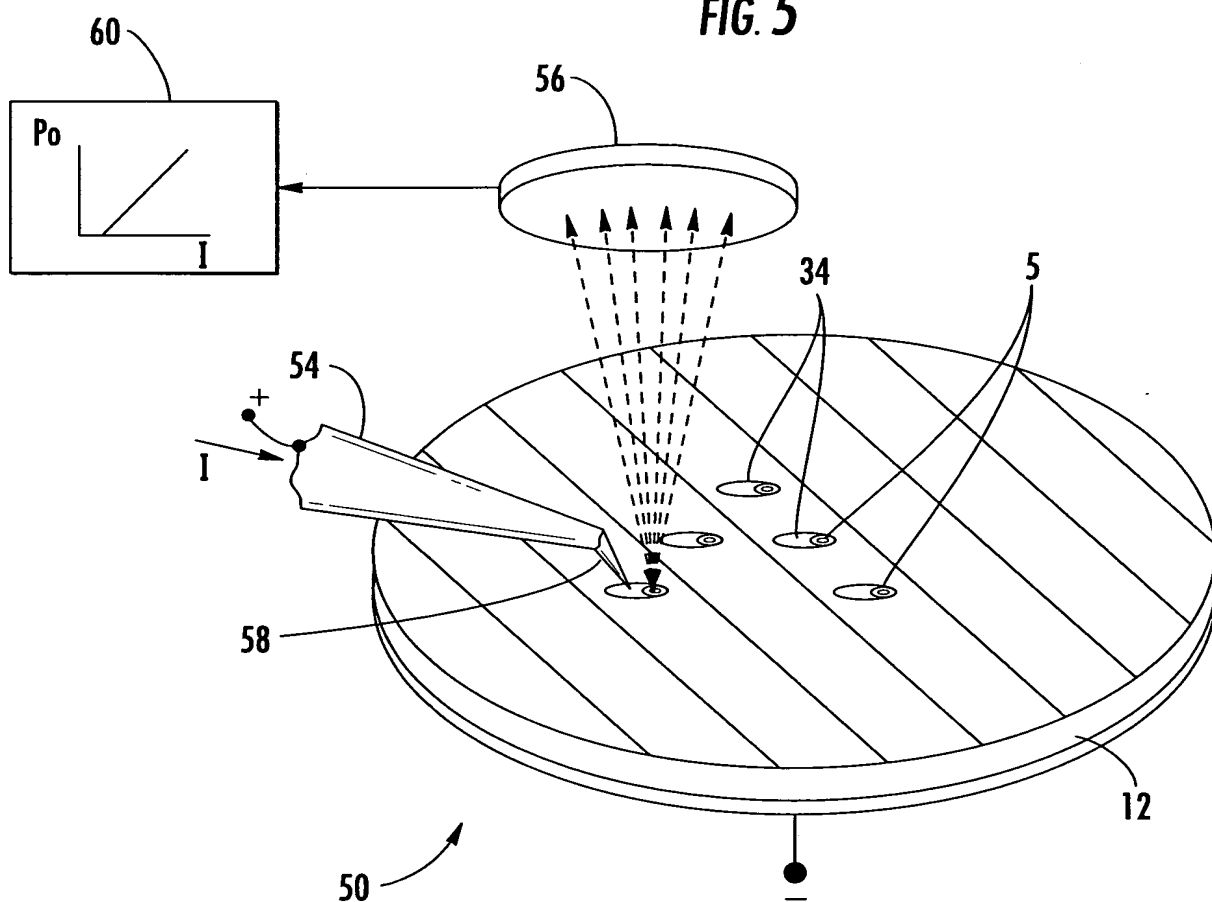
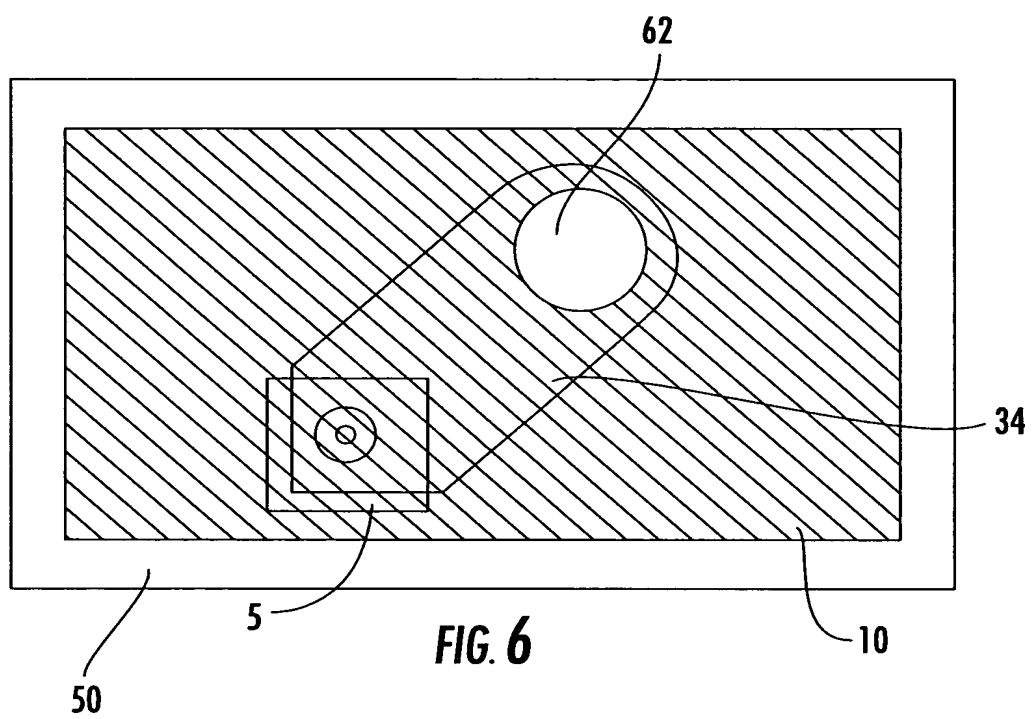


FIG. 5





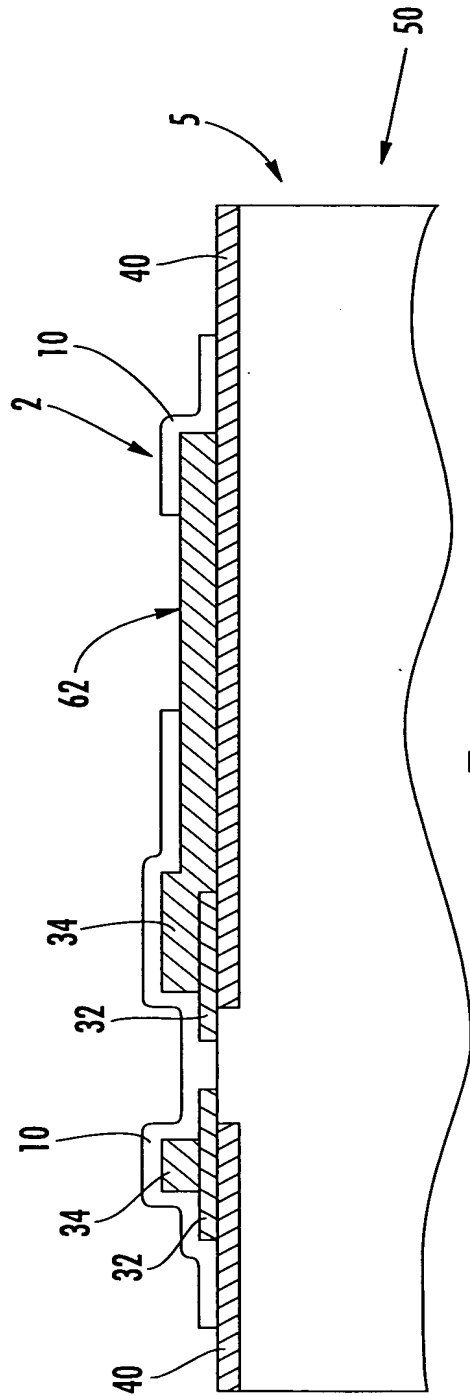
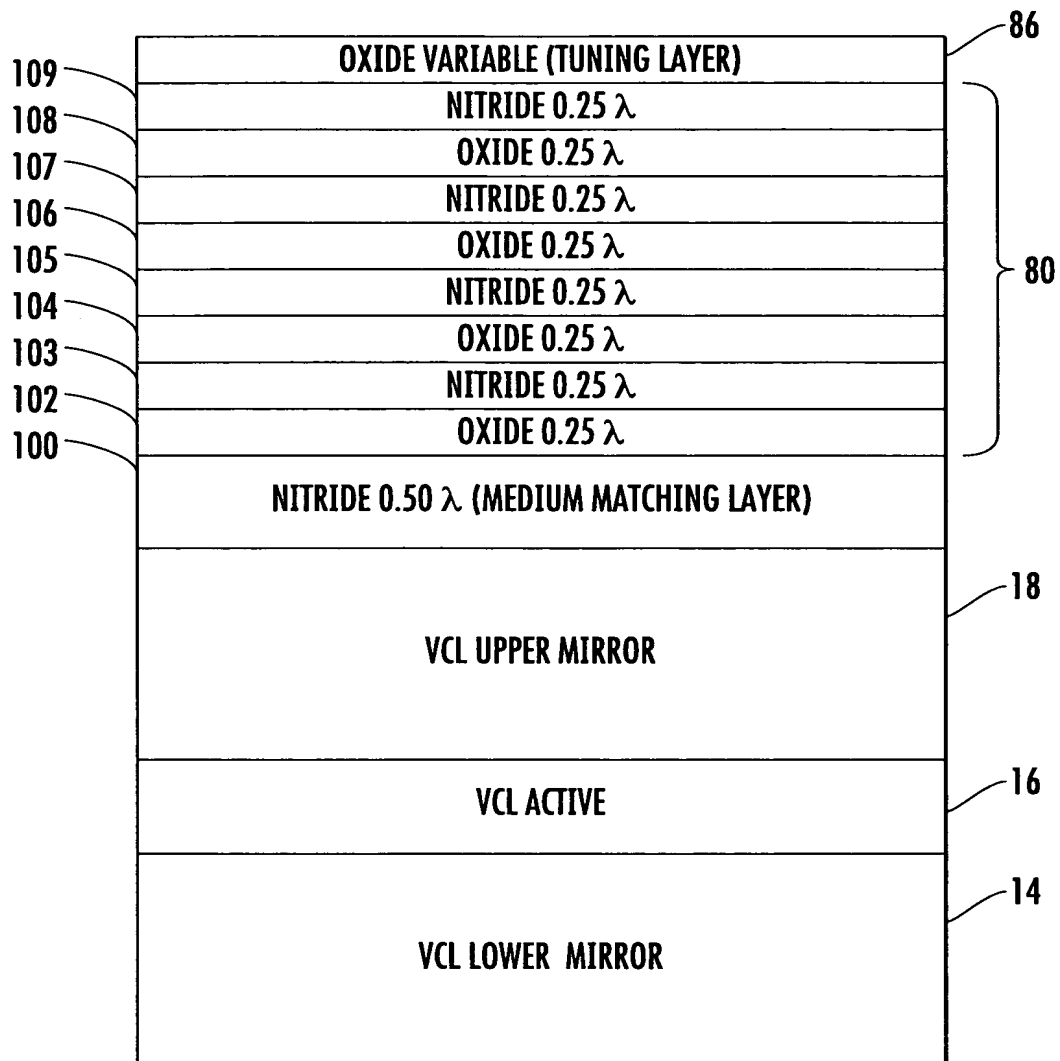


FIG. 7

**FIG. 8**

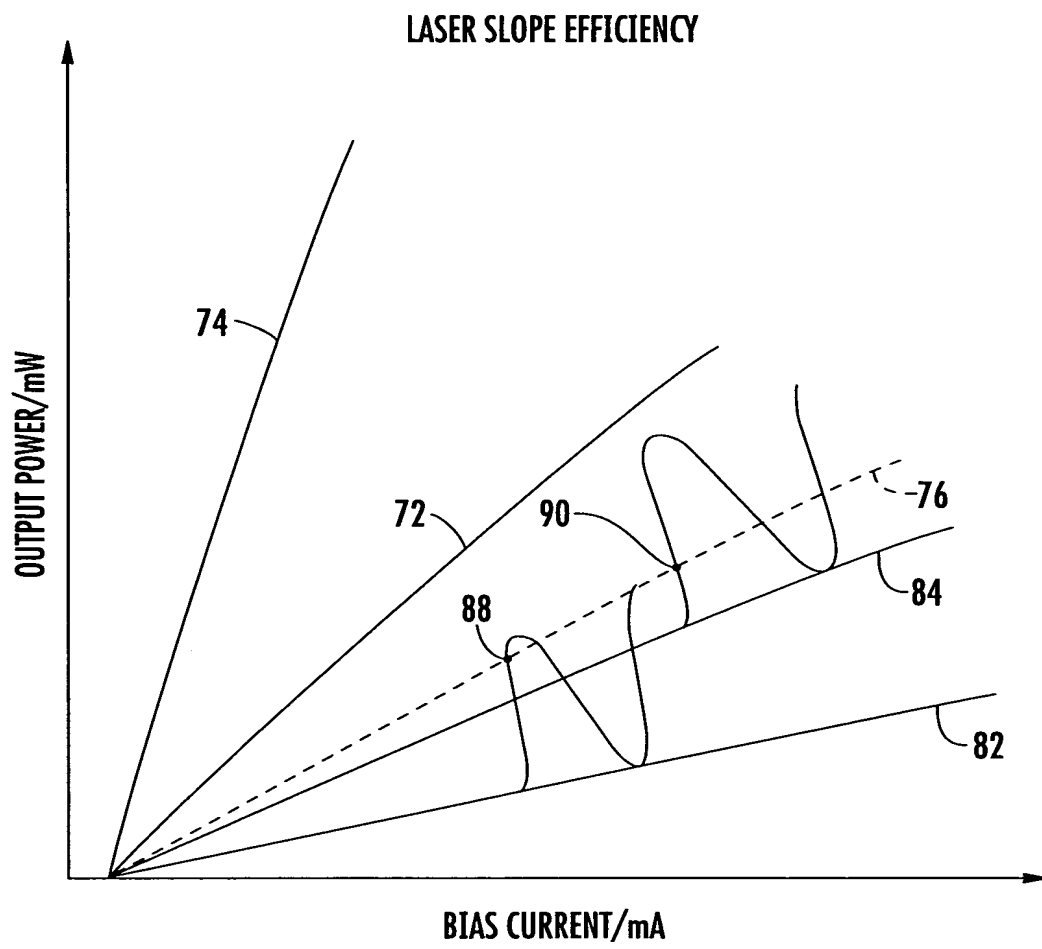


FIG. 9

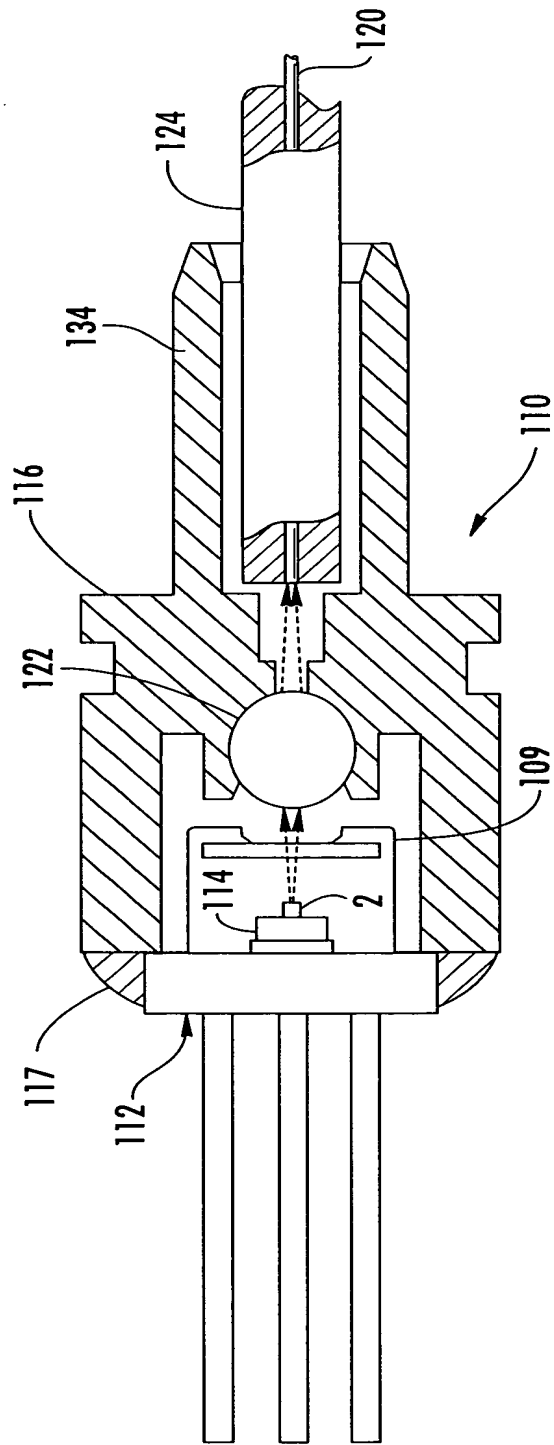


FIG. 10

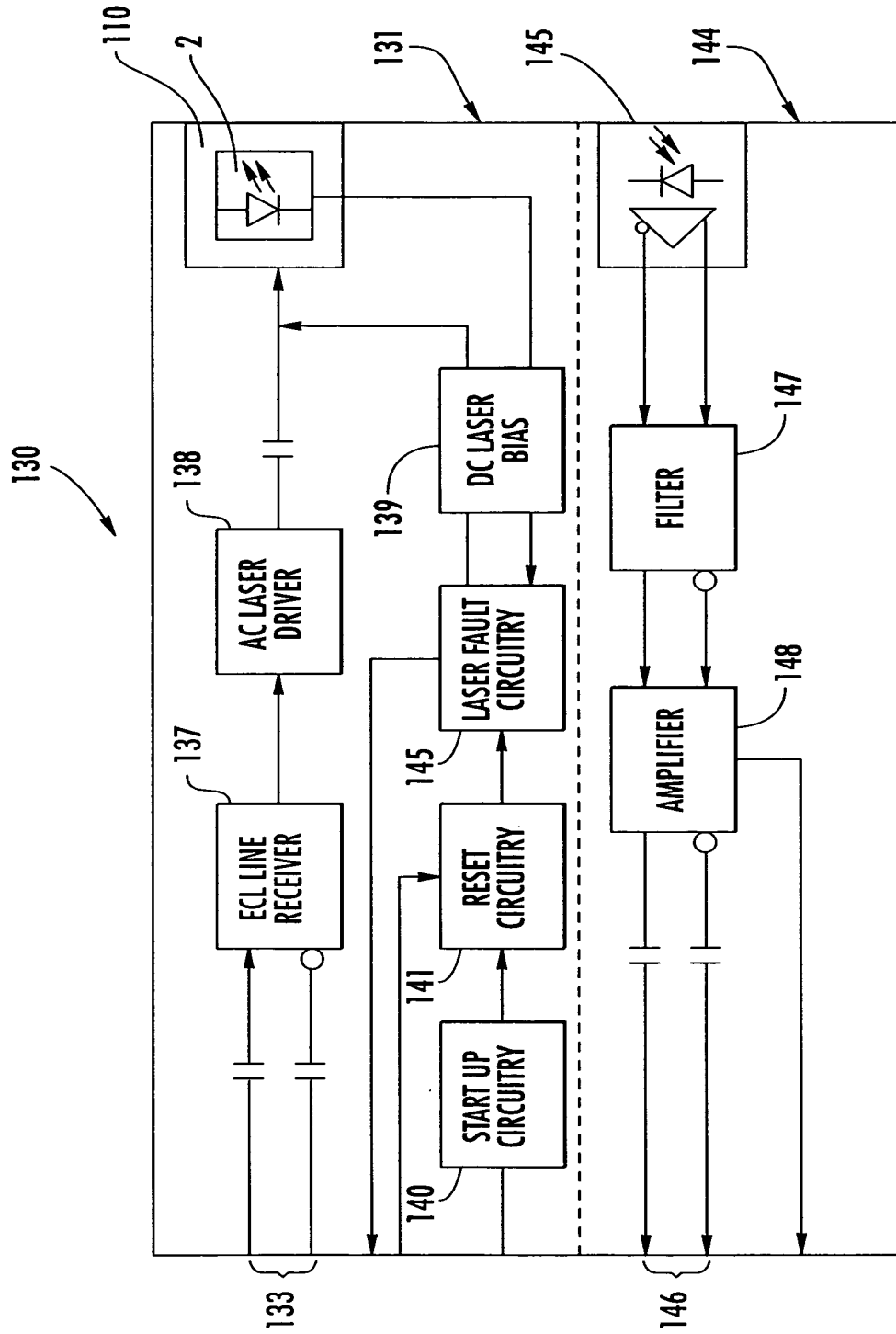


FIG. 11

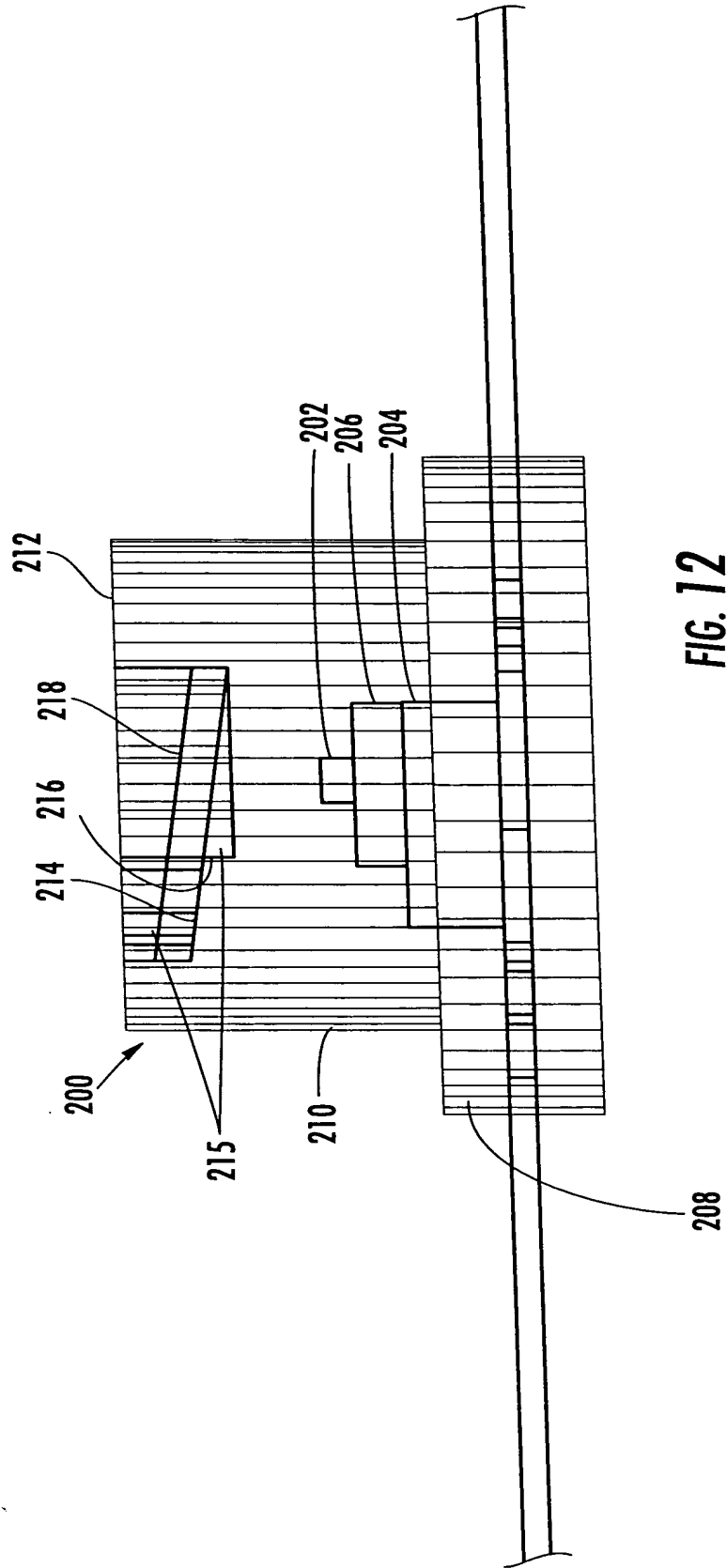


FIG. 12

SMALL FORM FACTOR CONCEPT
PLASTIC ENCAPSULATED

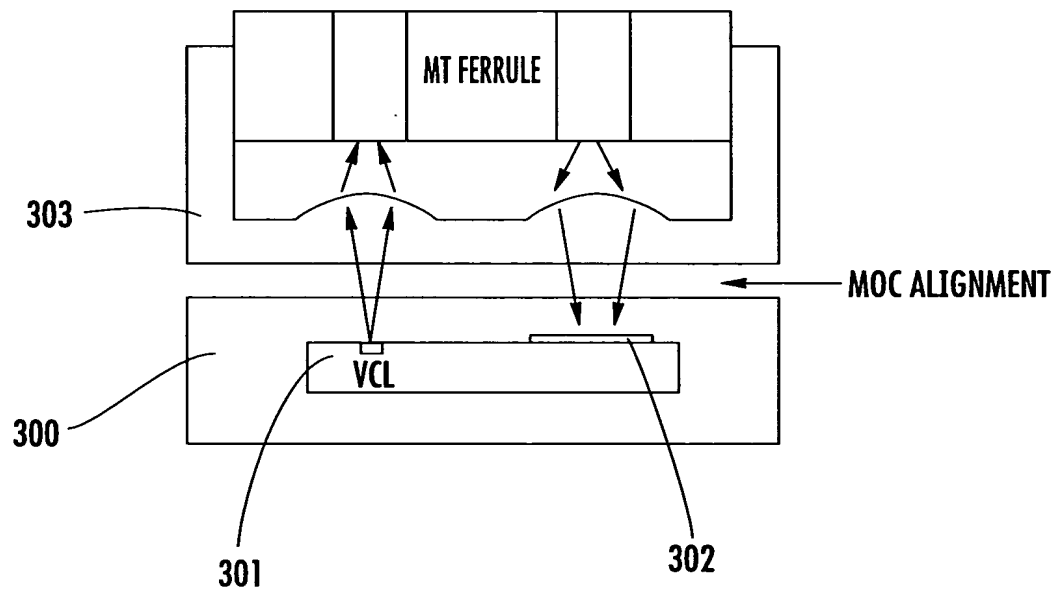
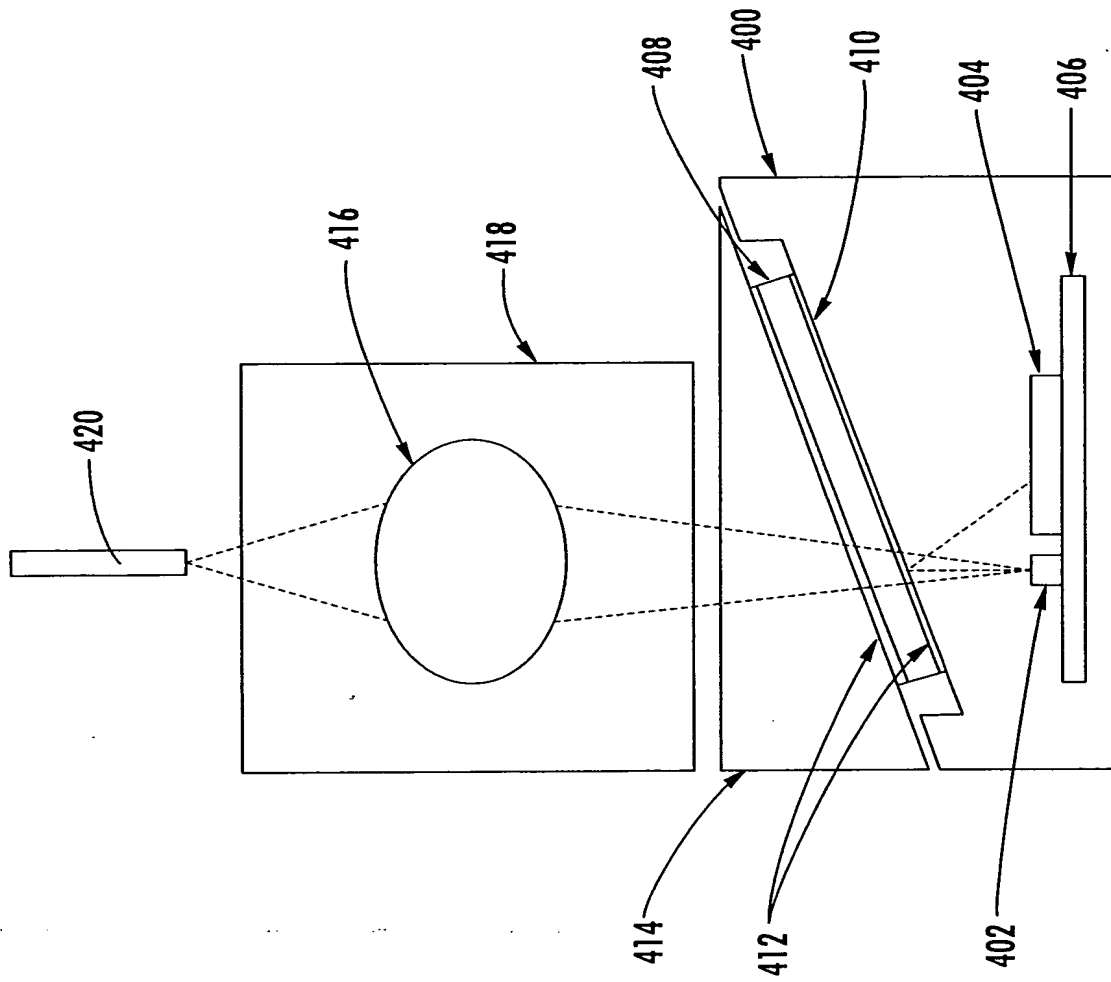
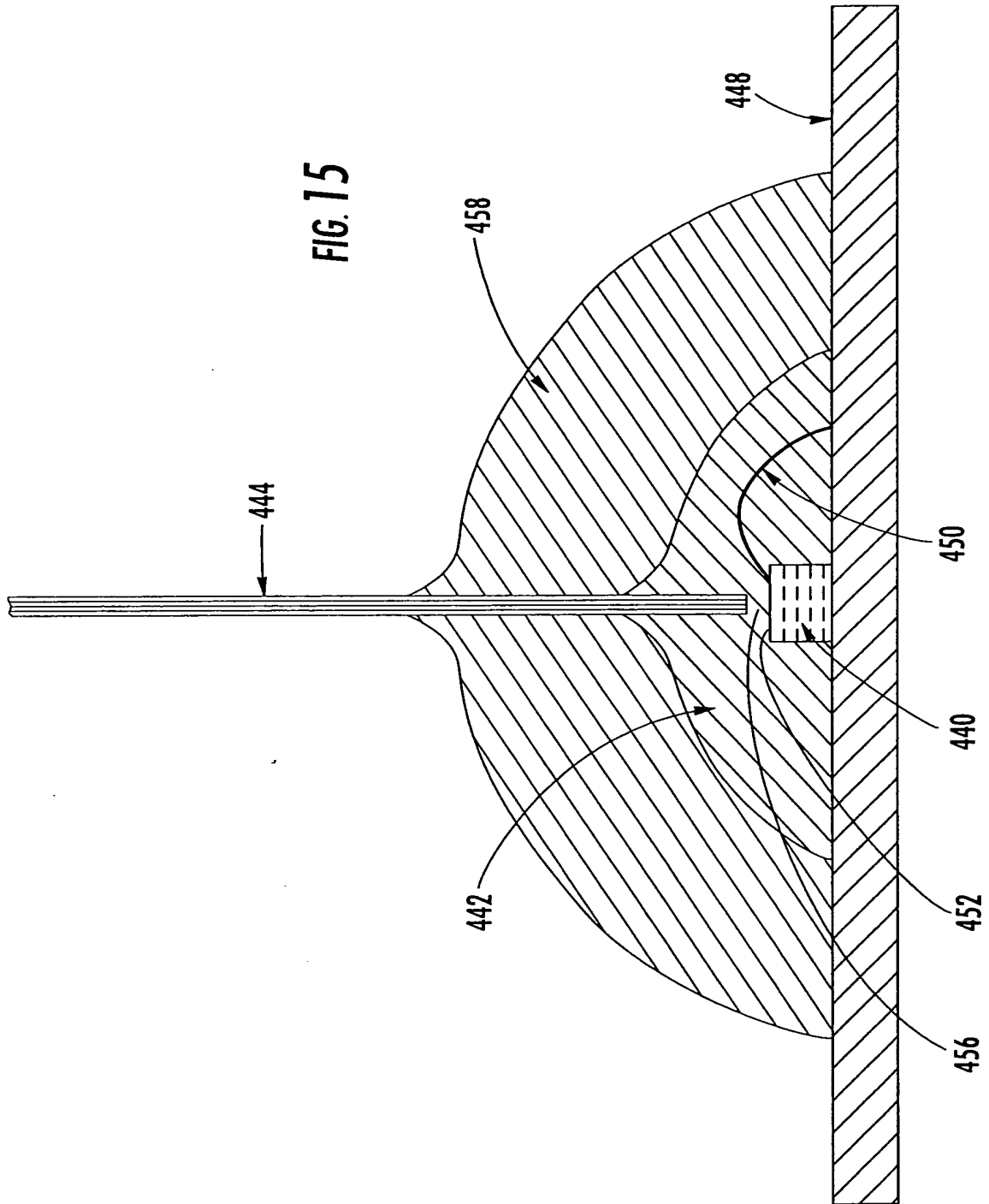
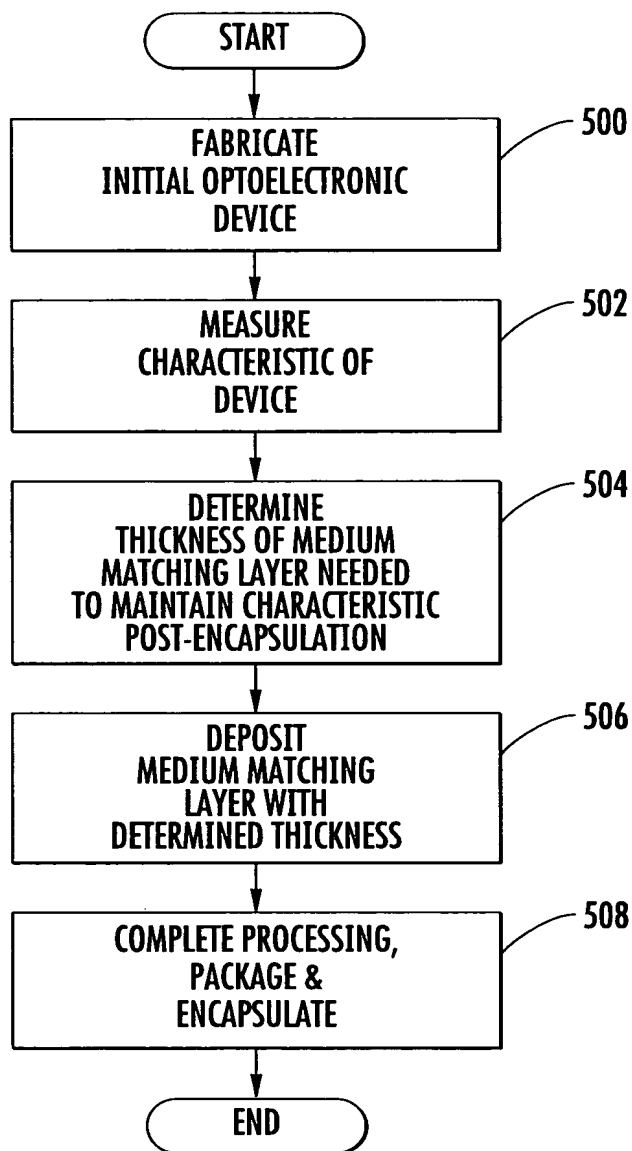


FIG. 13





**FIG. 16**

VCSEL STRUCTURE	OXIDE MEDIUM MATCH THICKNESS (Å)	TRANSMISSION IN AIR (%)	TRANSMISSION IN PLASTIC (%)
4 PERIODS +	0	0.017	0.025
4 PERIODS +	200	0.017	0.025
4 PERIODS +	400	0.018	0.025
4 PERIODS +	600	0.020	0.024
4 PERIODS +	800	0.023	0.024
4 PERIODS +	840	0.024	0.024
4 PERIODS +	1000	0.027	0.024
4 PERIODS +	1200	0.032	0.023
4 PERIODS +	1400	0.034	0.023

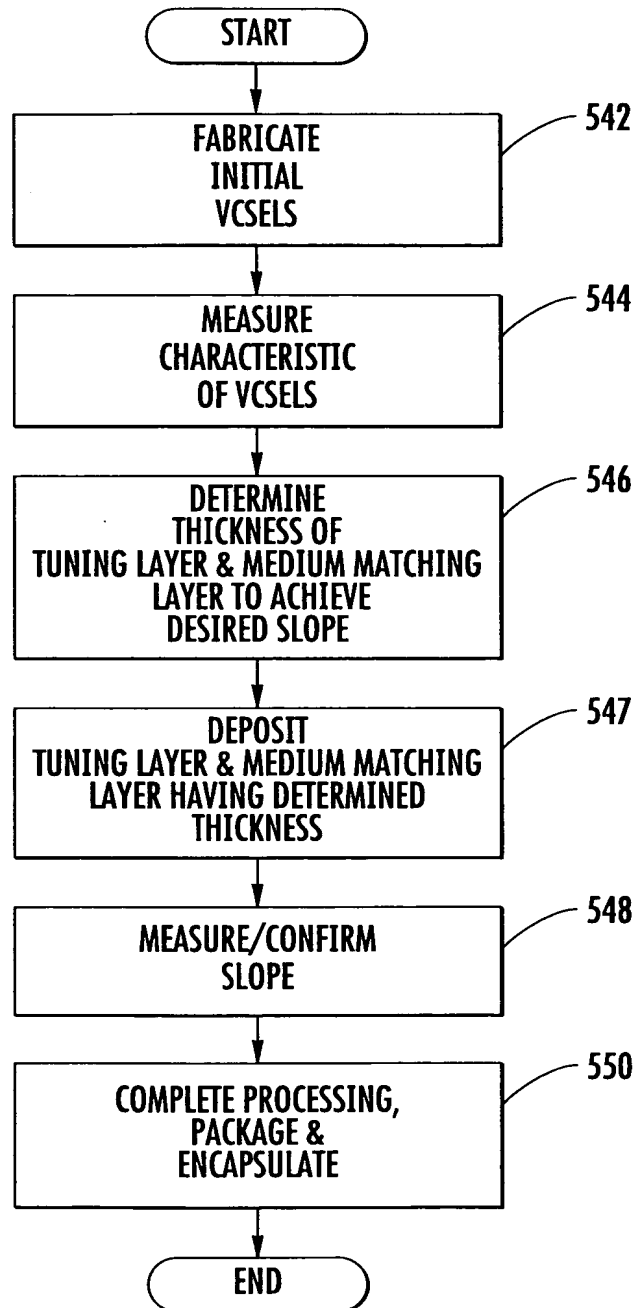
FIG. 17

LAYER	AIR OR ENCAPSULANT	$T = 1 - R$ ↑
1	MEDIUM MATCHING	
2	NITRIDE 0.25λ	
3	OXIDE 0.25λ	
4	NITRIDE 0.25λ	
5	OXIDE 0.25λ	
6	NITRIDE 0.25λ	
7	OXIDE 0.25λ	
8	NITRIDE VARIABLE (TUNING LAYER)	
9	OXIDE 0.25λ	
10	NITRIDE 0.25λ	
	VCSEL UPPER MIRROR	
	VCSEL UPPER ACTIVE	
	VCSEL LOWER MIRROR	

FIG. 18

TUNING LAYER THICKNESS (LAYER 8)	MEDIUM MATCH THICKNESS (LAYER 1)	TRANSMISSION IN AIR OR PLASTIC	LOSS	OPTICAL EFFICIENCY	SCALED
AS GROWN	NO MIRROR	0.256	0.3	0.460	1
1062	840	0.024	0.3	0.074	0.161
850	1050	0.025	0.3	0.077	0.167
637	1300	0.029	0.3	0.088	0.191
425	1550	0.036	0.3	0.107	0.233
212	1930	0.042	0.3	0.123	0.267
0	2330	0.045	0.3	0.130	0.283

FIG. 19

**FIG. 20**

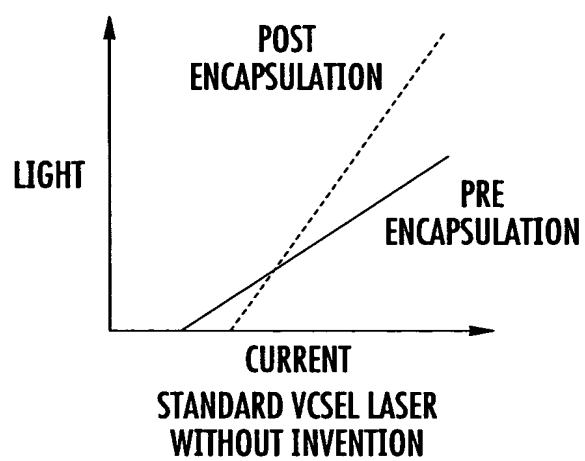


FIG. 21
(PRIOR ART)

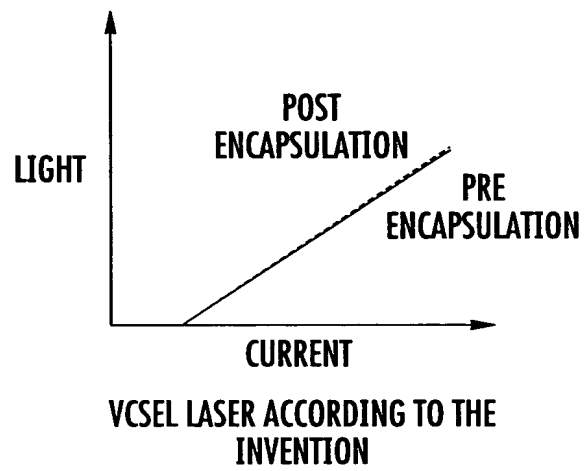


FIG. 21A